EKO20 User Manual

Version Wa8 (for Windows 95/98/NT)

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0. Introduction

The EKO20 is an easy to use, accurate and reliable datalogger system essential for e.g. wind energy feasibility studies. Controlling and working with the EKO20 is made easy with this Control Program for Windows.

For best possible performance of the system as a whole read this manual carefully before using the EKO20
When installing the software take note of the Tips!

If you need to go into the field take this manual with you in order to solve possible problems.

All the text printed *Italic* are buttons or menu options which can be used in the program. Text printed underlined are important notes and tips.

1. MOUNTING AND INSTALLATION

1.1 General

The installation is very simple and is carried out in the following steps:

- Mount cabinet (cable inputs facing to ground)
- Connect sensors and signals, according to appendix A.2
- Prepare memory card if not already done, refer to section 2.3.1.
- Put (prepared) memory card in slot
- Put batteries in battery holders (or connect external power supply)

Now the operation has started! Plug-in and play !

For more details refer the following chapters.
Refer to appendix A for specific information about the supplied configuration of the datalogger.

1.2 Mounting

The cabinet of the EKO 20 datalogger should be mounted with cable plugs facing to ground. The EKO 20B has two covers:
Under the upper transparant cover is situated: Status leds, battery holders and slot for PC CARD (PCMCIA) memory card. The upper cover can be locked.

Under the lower grey cover is situated: the input connectors. At the lower grey cover, inside the logger, the connections and channel specifications are printed.

If the EKO 20 datalogger is placed in the field, it should be protected against vandalism and harsh environmental conditions (direct sunshine, rain etc.) The best solution is to place the logger in an additional case with lock, which can also be supplied by Ekopower.

The cabinet can be fixed to a wall or pole, with cable plugs faced to ground. Always close the cabinet carefully before you leave the instrument.

For mounting the sensors & signals and the connections of the sensors, power supply / batteries refer to
Appendix A.

2. How to get started?

2.1 Installing the EKO20 Control Software

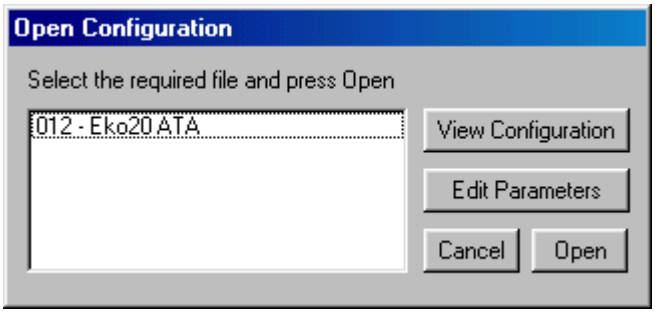
Installing the Control Software on a Windows 95'/98'/NT/2000 based PC.
Press the *START* button and choose the *RUN* option.
Put the disk labeled "DISK 1" in your disk drive.
Enter "A:\Setup.EXE" and press the *OK* button.
The Install Wizard will guide you through the installation process.
Tip: When the Install Wizard prompts you for a destination directory in which to install the software change its name into a shorter and easier to use directory name by pressing the *Change Directory* button e.g. C:\EKO20 or D:\WindResearch (C:\ or D:\ depends on the hard drive you want to use).

After installing the Control Software you have to copy the EKO20-Configuration file into the same folder in which the Control Software is installed .
Put the disk labeled "EKO20-Configuration" into your disk drive.
Open the *Windows Explorer* and select the "Floppy Drive A:" in the left window. Drag the EKO20-Configuration file into the folder which contains the Control Software (e.g. C:\EKO20 or D:\WindResearch). Refer to the Windows Explorer Help topic *"copying, by using drag and drop".*

2.2 Using the Control Software for the first time

After installing the program (Refer to section 2.1) you can start using the program.
Press the *START* button and choose *PROGRAMS*. Select the EKO20 option to start the program. (Refer to the Windows Help about making a shortcut to the Desktop)

After starting the program asks you to open a Configuration File. Choose one of the available files and click the *OPEN* button (refer to the troubleshoot section if no files are displayed).
Because this is the first time you are using the program you have to setup your computer first.
Use the *Setup PC* menu option to setup your PC.
Install the correct Communication Port and PC Slot by selecting out of the list displayed.
(refer to the troubleshoot section if list is empty)



Important:
Every time the configuration of the computer changes you have to run *Setup PC* Again!

Your system is now ready to work with the EKO20 Datalogger. With the Control Software you are able to control and manage wind measurement projects in a fast, easy and reliable way.

3. Using the EKO20 Control Software for Windows

3.1 Basic operations

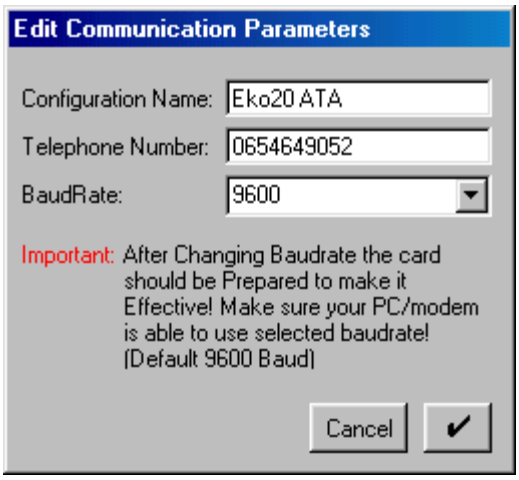
Every time you use the EKO20 Control Software you are prompted to open a Configuration File of the particular EKO20 you want to Control. After selecting and opening a file all possible menu options are available for use (refer to the troubleshoot section if not all options are possible).
This is a summary of the basic operations:

File|Open Configuration – Open, edit or view an existing Configuration File
File|Exit – Exit the EKO20 Control Software.
Memory Cards|View Card – View the configuration on the Memory Card currently in the PC Slot.
Memory Cards|Prepare Card – Clear the data on the card and prepares the card for re-use in the EKO20.
Memory Cards|Download Data – Download the data from the Memory Card currently in the PC Slot.
Local Connection|Status – Check the operation of the EKO20.
Local Connection|Current Values – Display the currently measured and the last recorded values.
Local Connection|Download Data – Download the data from the Memory Card currently in the EKO20.
Modem|Connect to Datalogger – Call the EKO20 through a telephone line and modem.
Modem|Hang Up – Terminate the modem connection.

The next sections explain all options in detail.

3.2 File *Menu*

Every time you start the EKO20 Control Software the program asks you to open a Configuration File (refer to section 2.2). Selecting a File and pressing the *Edit Parameters* button gives you the opportunity to change three properties:



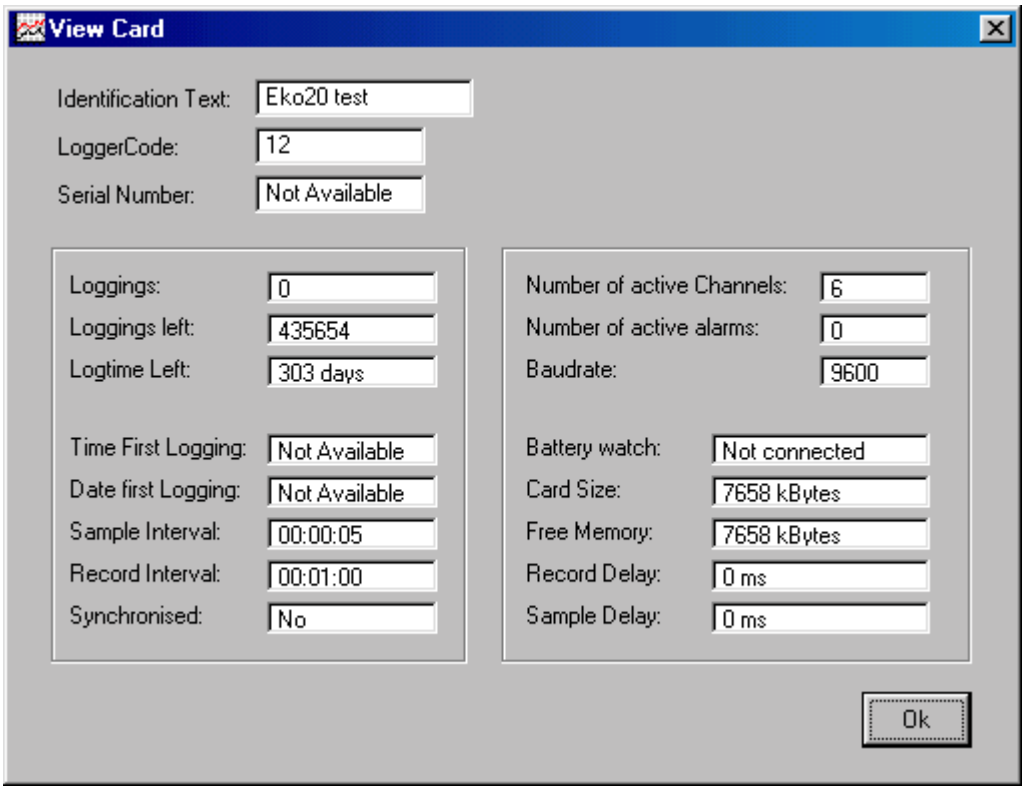
Configuration Name: The name for a specific Configuration. This is automatically the name of the directory in which the downloaded data is saved!
Telephone Number: If the logger is connected to a modem the telephone number should be entered here. If the telephone number is empty the *modem* option is not possible.
BaudRate: The Serial Communication Speed which will be used for local Serial communications as well as remote modem communications. Make sure your equipment (PC, modem) is capable of using the selected BaudRate (refer to documentation of equipment)! After the necessary changes have been made press the *OK* button to save the changes.
Important: changing the baudrate will only have effect after preparing the memory card!
If the *View Configuration* button is pressed an overview of all properties of every input channel is given.
The *File* menu also allows you to exit the program.

3.3 Memory Cards Menu

All options available in the *Memory Cards* menu interact with the memory card which should be in the PC card slot.
To install ATA-FLASH cards on your computer just put a card in your PC-card slot and windows will automatically install it for you! PLUG & PLAY!
After installing windows will treat the ATA FLASH card as a hard drive!

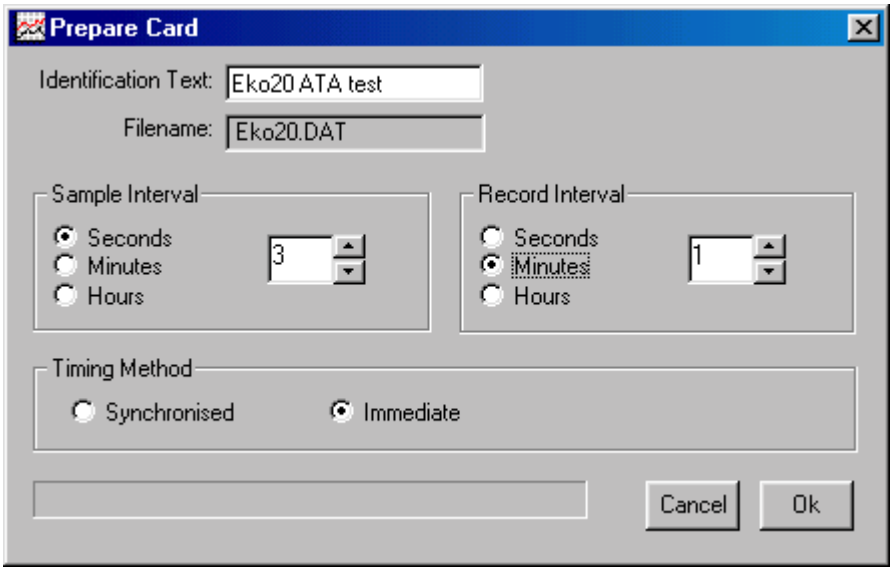
3.3.1 View Card

View Card allows you to look at different settings which are currently on a memory card.



3.3.2 Prepare Card

Prepare Card enables you to make a memory card ready for use in an EKO20. “Prepare Card” clears all data on that card and creates a file with default name EKO20.DAT. The size of this file is equal to the size of the formatted card. After preparing a card it can be inserted into the EKO20 and a measuring period will start.
Before a card can be prepared the card needs to be formatted using Windows.



There are 4 parameters that need to be filled in. The Identification Text identifies a specific measurement period, Sample interval determines when a sample is taken. Record Interval determines when data should be written to card. Setting the Timing Method to synchronized the logger will write to card in a (rounded) 10 minute interval e.g. 11:10:00, 11:20:00, 11:30:00, etc. Immediate measurements will start directly.
Notes:

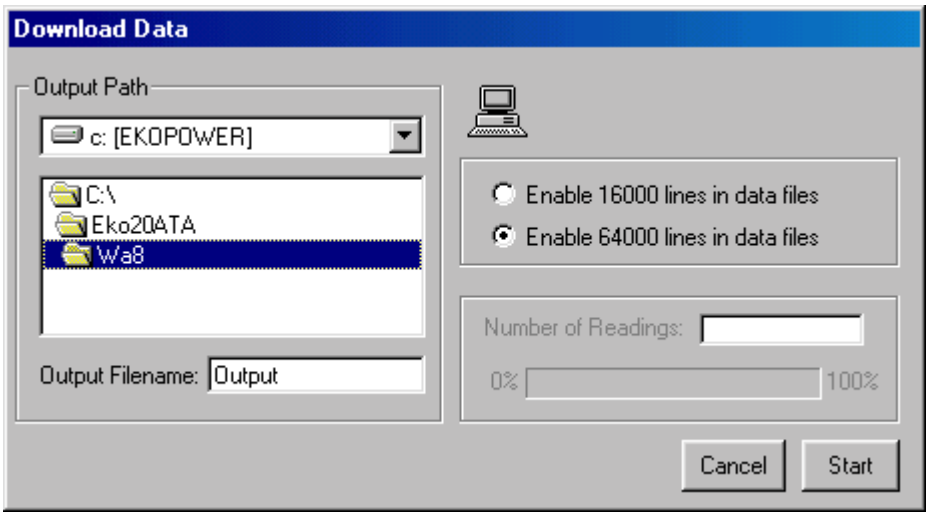
- The sample interval should be less and multiple of record interval
- If synchronized the intervals get default values (3 seconds, 10 minutes)
- If the intervals on a *synchronized* memory card are changed the card will no longer be synchronized

There are some important notes, please read these carefully:

- If there is data (which is not downloaded) on the card before preparing it the program will respond with a warning and will NOT prepare the card. Download the data from the card first (check if data is correct!) and try preparing it again. The program will erase all data on the card and prepare it. The card is now ready for use in the EKO20.
- If a card is prepared for use in logger 1 (with Logger Code 1) and inserted in logger 2 (with LoggerCode 2) it will respond with the error message “Card not Prepared” (on LEDS and through the Status option refer to section 3.4.1). Download possible present data using the Configuration file belonging to logger 1 and prepare the card using Configuration file belonging to logger 2. Insert card into logger 2 and logging will start.

3.3.3 Download Data

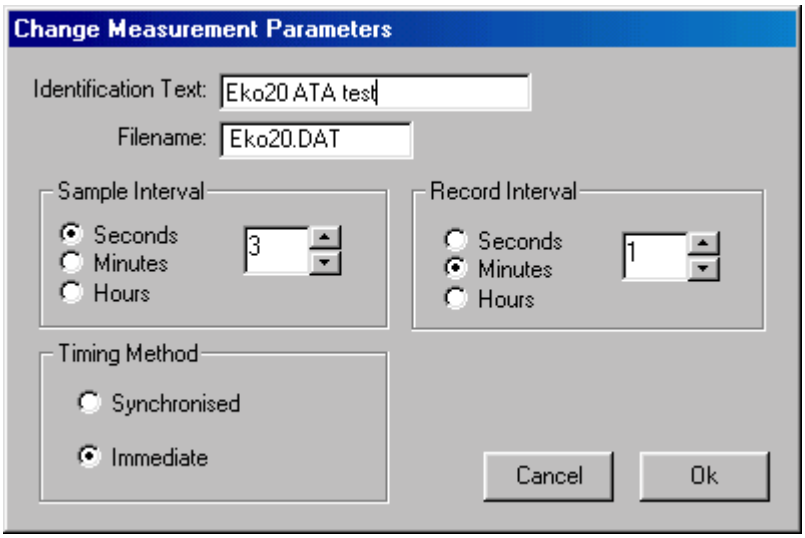
Downloading data through a PC card drive is the fastest way of downloading possible.



Create an Output Path by selecting a drive, a directory and a filename. The program automatically adds a directory to your selected directory. This added directory has the same name as the configuration name.
E.g. Configuration Name is “Site Peru”, the directory in which the data is saved is “C:\EKO20 Windows\”.
The Output Filename is “Output.P0” , “Output.P1” , “Output.P2”, etc (the extension is added automatically by the program). In this example the full file/path name would be: “C:\EKO20 Windows\Site Peru\Output.P0”.
If the *“16000 lines in data file”* option is set all files will have a maximum of 16000 lines in each file. If you are going to use the *Data Processing Utilities* made by Ekopower it is possible to use 64000 lines in each data file! Select the *“64000 lines in data files”* to do so.
Press the Start button to start downloading. The progress bar indicates the progress of downloading.

After downloading the program asks you if you want to prepare the card. (refer to section 3.3.2 on preparing cards)

3.3.4 Change Measurement Parameters



It is possible to change the Measurement Parameters without preparing the memory card. After changing these parameters data which was already on the memory card will NOT be lost.

Parameters included are Identification Text which identifies a specific measurement period, Sample and Record Interval and Timing Method (refer to section 3.3.2).

Notes:

- the sample interval should be less and multiple of record interval
- if synchronized the intervals get default values (3 seconds, 10 minutes)
- if the intervals on a synchronized memory card are changed the card will no longer be synchronized

3.3.5 Logger Configuration

This option is only possible for authorized personnel. Password is required

3.4 Local Connection Menu

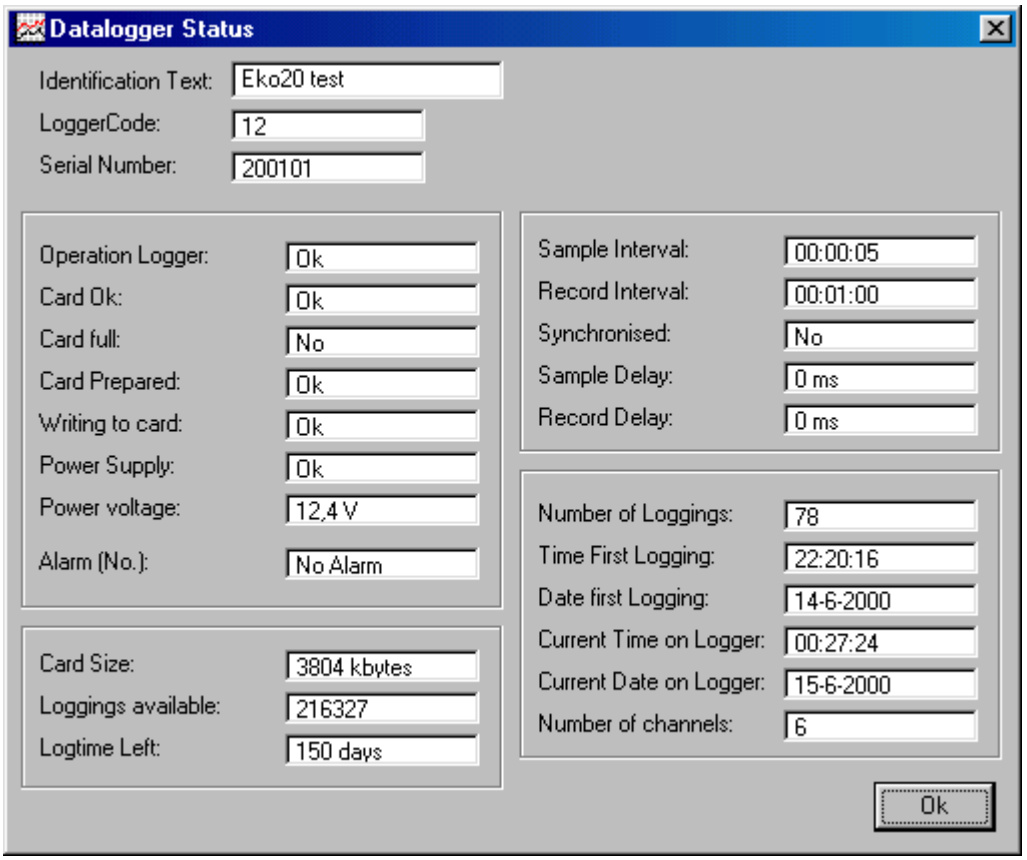
After connecting the serial cable LC 20A it is possible to make contact with the logger through your serial communications port. When connected correctly the "RS232=ON" LED will light up.

Note:

When a PC in connected to the logger through a serial communications port the logger consumes more power so if you do not use this connection please remove the serial cable.

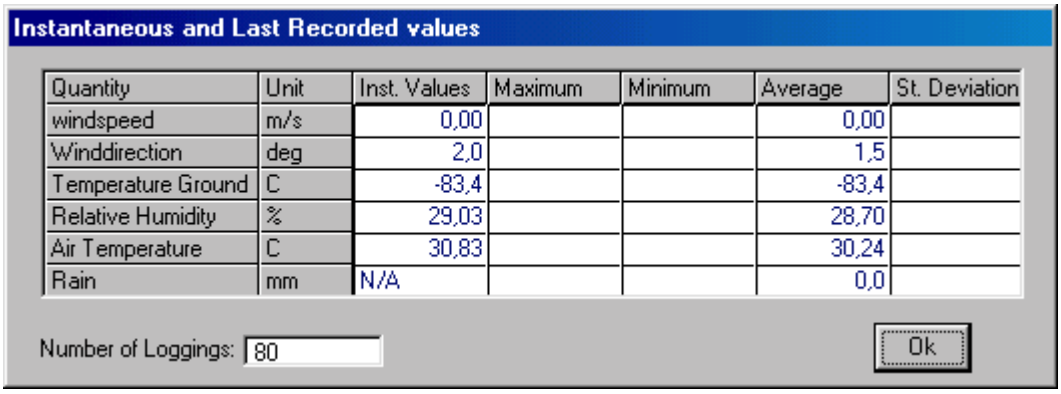
3.4.1 Datalogger Status

With this option it is possible to check the operation of the logger. If the operation is not ok the type of error is given here e.g. a full card, low power, etc.



Besides checking for errors it is also a good tool for viewing the settings e.g. sample and record interval, number of input channels, etc.

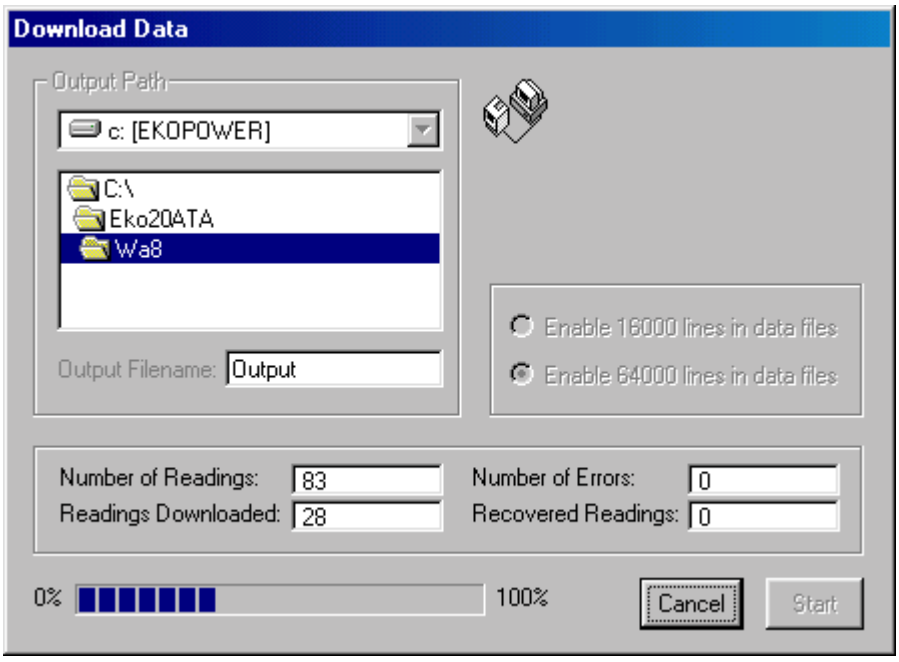
3.4.2 Current Values



This is another useful tool for checking the operation of the EKO20. The instantaneous value of every active channel is displayed in the first column and is updated every sample interval. The last recorded values are displayed in the other columns. The last recorded values are updated every record interval.

3.4.3 Download Data

Downloading data through serial port is much slower than downloading through PC card drive and consumes much more power! Refer to section 3.3.3 for information on downloading data.

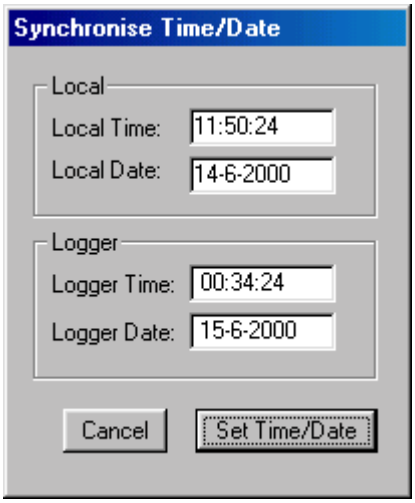


Note:
With every logging that is sent by the EKO20 a sumcheck is sent with it. If the sumcheck made by the EKO20 differs from the sumcheck made by the PC an error is generated. That particular logging is sent again until no errors are detected. When 25 errors are received downloading is stopped! Usually these errors occur because of a bad telephone connection. Try downloading a few hours later, if the problem persists check your modem or contact your telephone company.

After downloading check the data for errors. If everything looks allright you can clear the card or continue without clearing.
When you clear the card the program asks you if you want to change sample or record interval. (refer to section 3.4.5)

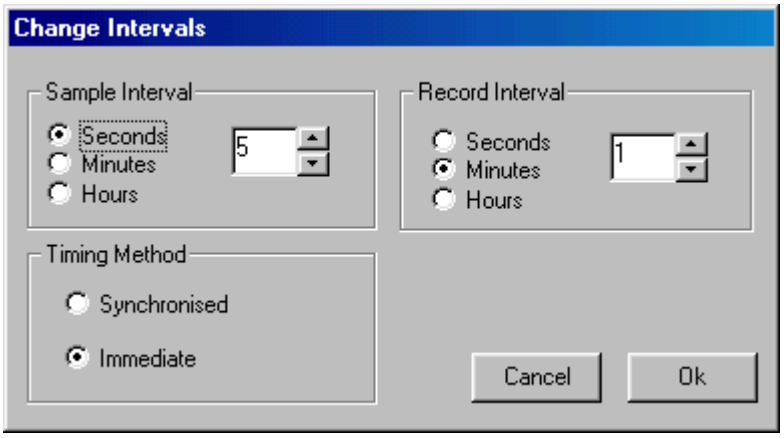
3.4.4 Set Time/Date

Use this option to copy the local time/date to the time/date on the logger. Before changing the time make sure the local time (on your PC) is correct (refer to Windows Help on setting time/date on your PC). After setting the time/date the EKO20 resets.



3.4.5 Change Sample & Record Interval

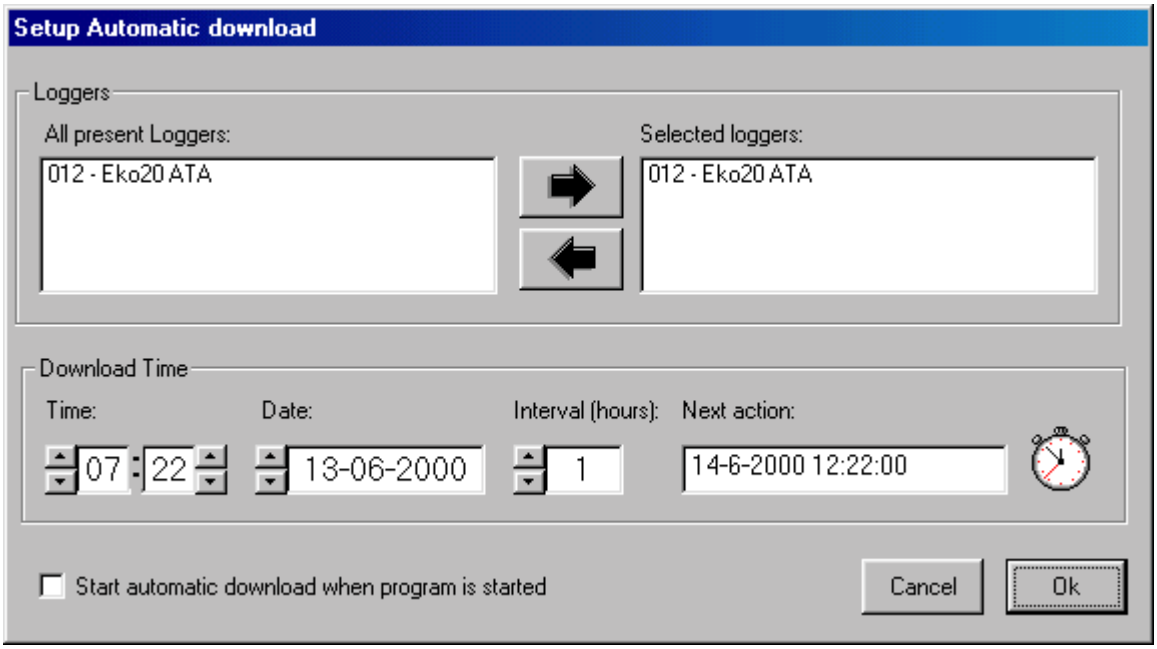
Refer to section 3.3.4

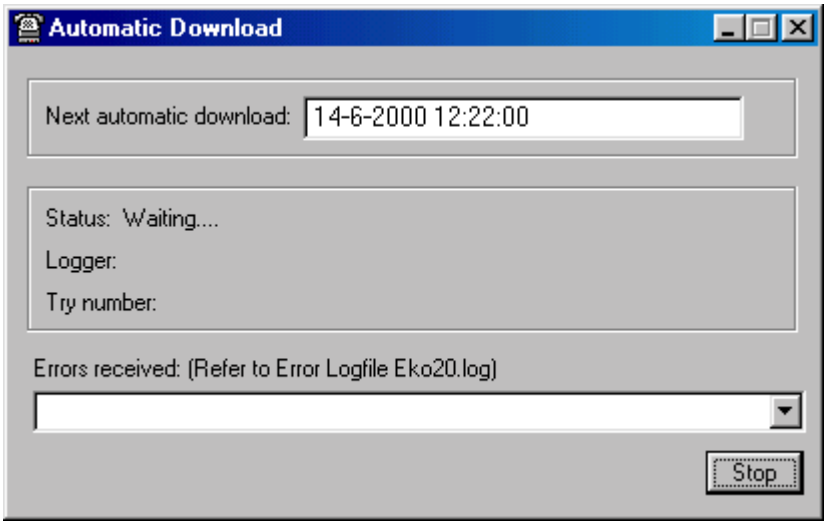


3.5 Remote Connection Menu

Depending on the type of remote connection choose either *telephone modem, GSM modem or Satellite*. All Remote Connection options are the same as the *Serial Connection* Menu, refer to section 3.4. Before these options are enabled you must contact the EKO20 through a modem and telephone line. Use the *Connect To Datalogger* option to call the EKO20 and *Hang Up* to disconnect with the EKO20. The telephone number which is dialed by the program can be entered/changed in the *File|Open Configuration|Edit Parameters* option. Use *Setup PC* to change the Communications Port.

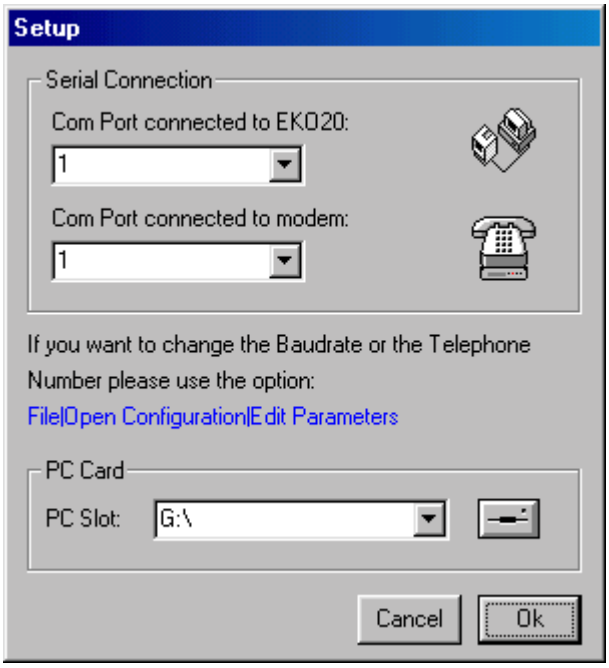
3.6 Automatic Download





3.7 Setup Menu

Use this option when you use the program for the first time (refer to section 2.2) or when the configuration of your PC changes (Com Ports or PCcard drives added/removed).



Select a communication port for connection to the EKO20 and modem. If these ports are the same (which is possible) make sure you use the right cable for the right option. Use a standard RS232 cable to connect your Modem to your PC and the LC20 cable (provided by Ekopower) to connect PC to EKO20.

3.7 Help Menu

The manual option displays this manual.
About displays the startup splash form.

4. Using the EKO20

4.1 General

The datalogger is easily operated: there are no buttons.
Not even an on/off switch! Just plug-in and play!

4.2 Starting and stopping a record period

To start a record period put a prepared Memory Card in the slot (refer to section 3.3.2 on preparing Memory Cards). When all connections have been made connect the power supply (or place batteries if the system will be installed in a remote area). The EKO20 will start automatically when the Memory Card is detected. If the Memory Card is taken out of the instrument the recording period is stopped.

When power supply is connected the LED indicators flash one by one, an initial self-test is carried out. This is also carried out when a new (prepared) memory card is inserted.
Check the status Leds for any detected errors, wait at least 1 record-interval to check the operation of the system
(refer to section 4.5)

The instrument is in a low power sleeping mode if there is no memory card in the slot. It checks the presence of a memory card each 5 seconds. Take the batteries out of the EKO20 if it is not in use!

Important:
Check the real time of the logger before starting a record period, refer to section 3.3.

4.3 Operation time and memory capacity

The maximum record period is determined by:

$$\frac{M}{(n * 2) + 6} * T$$

in which

M = memory capacity in bytes (e.g. 4 Mbytes)
n = number of active channels
T = record interval (e.g.10 min.)

If continious recording is required, transfer the collected data within this period.

For example consider the following configuration:

windspd 1: MAX, AVG and DEV
winddir 1:AVG
windspd 2: AVG
M = 4 Mbyte
T = 10 min

the maximum operation time is

$$\frac{4{,}000{,}000}{(5 * 2) + 6} * 10 \text{ min} = 2{,}500{,}000 \text{ minutes } (=1736 \text{ days})$$

You can also obtain the maximum operation time using the control software (refer to section 3.4.1).

4.4 Data transfer and data processing

Retrieving the data measured by the EKO20 is possible in several ways:

- Take the datalogger back to the office and connect it to a PC and transfer the data (without additional equipment).
- Take a (portable) PC to the datalogger for data transfer in the field this can be done by the RS 232 interface or PC CARD (PCMCIA) drive of the laptop PC.
- Send the PC Memory Card to an office PC with PC Card drive.
- Use the optional remote control option.

For the data processing a standard PC (Pentium) personal computer or compatible is required. Ask your supplier for the best IBM-compatible PC or notebook.

Standard software for **DATA-ANALYSIS** is available, which can be used for many applications. With the standard software one can determine for each channel for any desired time-interval:

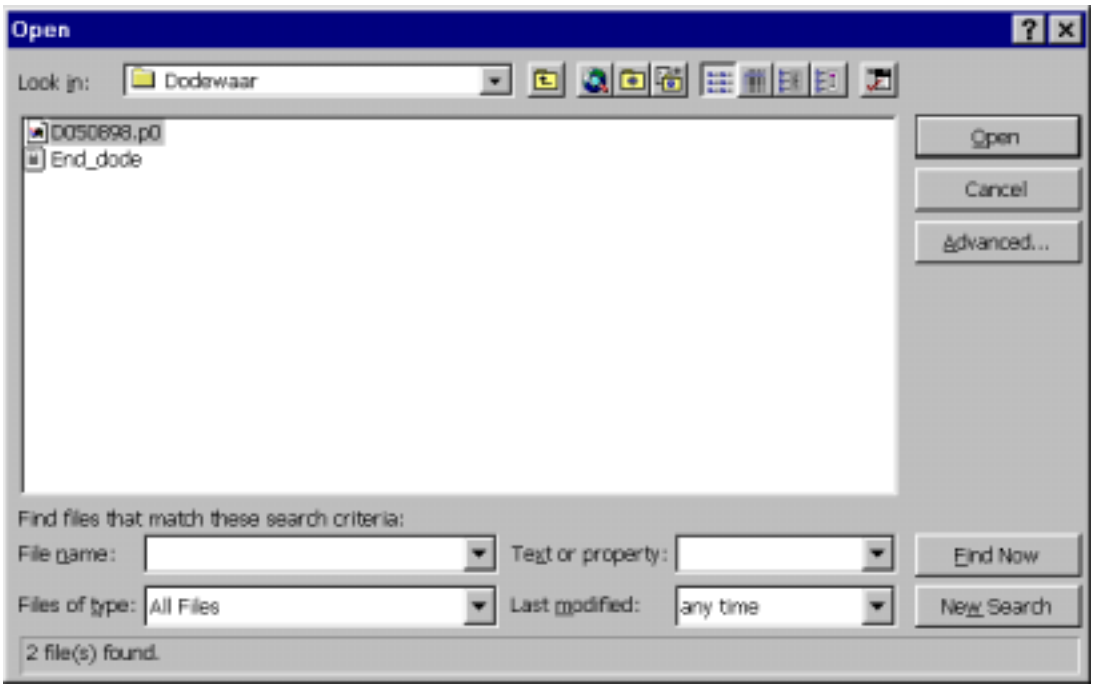
- TABLES
- GRAPHS
- STATISTICS
- WINDOW and LEVEL ANALYSIS
- BINNING ANALYSIS

Data transfer to Excel or other software packages (e.g. special packages for data processing, statistics and presentation) is possible.

Using Excel one can in most cases easily process the data according to the specific requirements of the user.
The output file (ASCII format) can be imported or converted to many other standard software packages, like dBASE,Dadisp,Turboview for Windows.

Moreover special Excel utilities are available for processing wind data, refer to separate datasheets.

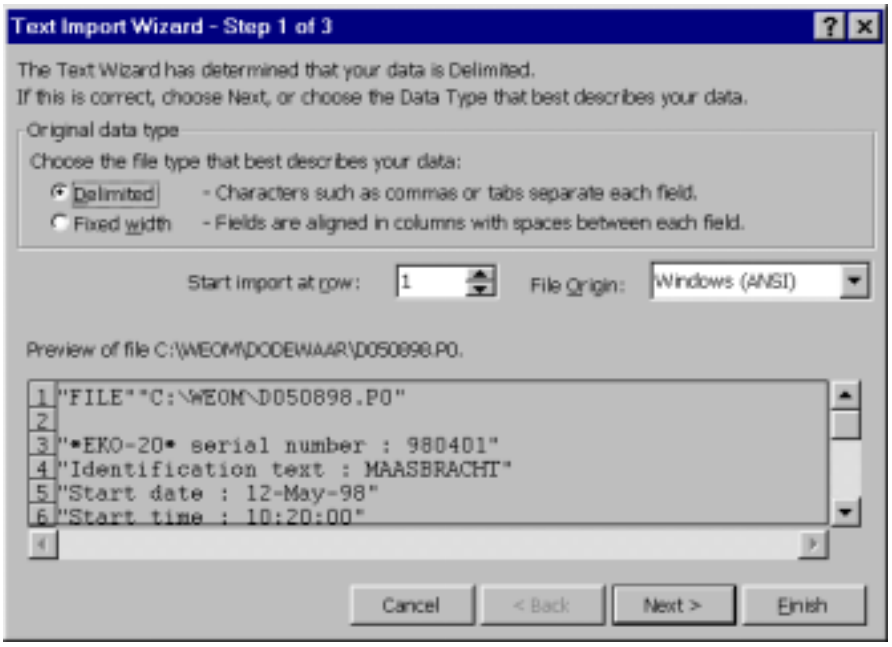
Opening EKO20 outputfiles
After downloading the data from the EKO20 memorycard the controlsoftware generated a *.p0 file. This is the file which needs to be opened in Excel. Start the Excel program and follow these steps:
Choose the *File|Open* option.
Change the *Files of type* into *All Files.*



Select the *.P0 file you want to open and press the *Open* button.

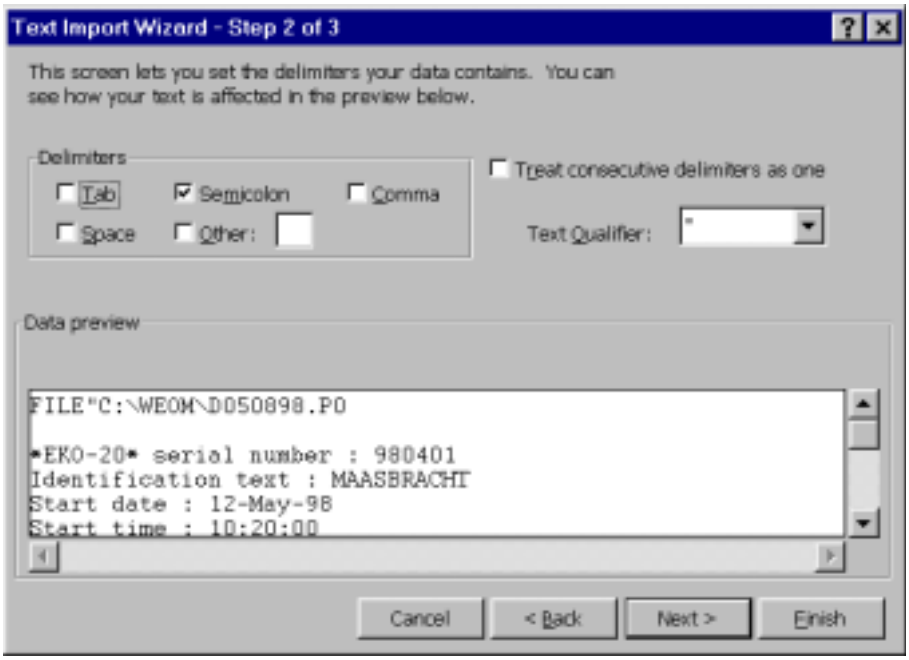
Excel starts the *Text Import Wizard*. Follow the 3 steps as displayed below.

Step 1:



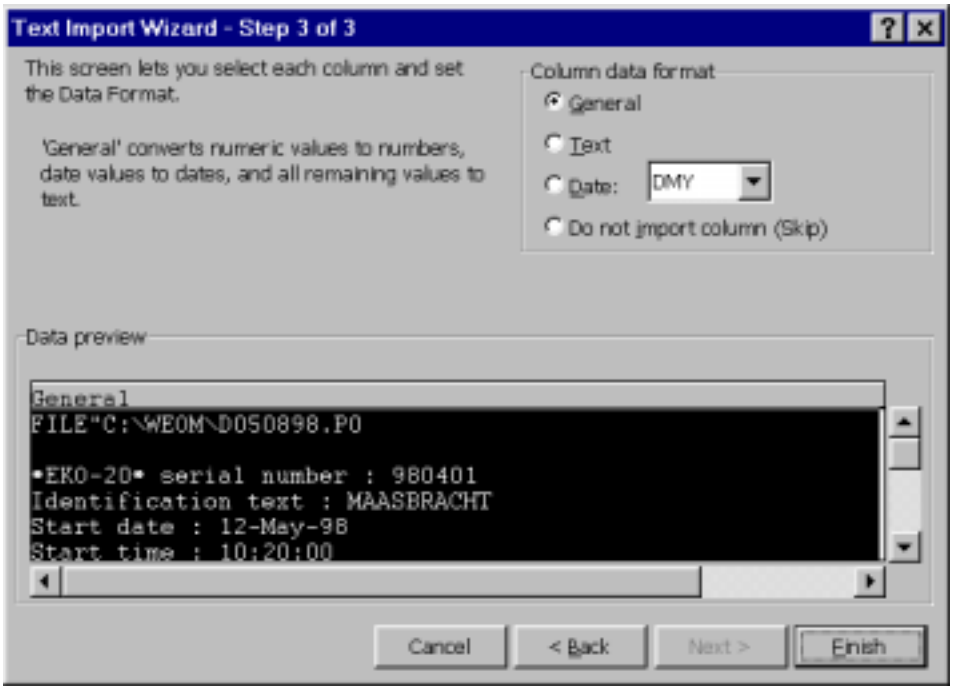
The *Original data type* option should be *Delimited*.
Press the Next button to go to the next step.

Step 2:



Select the *Semicolon* as *delimiter*.
Press the *next* button to go to the last step.

Step 3:



No changes have to be made in this form. Press the *Finish* button to stop the Wizard and import the *.P0 file.

4.5 Record checks and trouble shooting; status LEDS

The status leds on the front indicate the status of the instrument.
This can also be read via the RS 232 connection (refer to section 3.4.1).

Status Leds:
Operational status:

- Operation OK: green, everything is OK
- Operation not OK:red, something is wrong: take action, refer to other Leds

Action:

- Replace batteries: red
- Replace card: red

Information: (all yellow Leds)

- Card not OK
- Card not prepared
- Card full
- Cannot write to card (Write protect switch OK?)
- If all analog channels are >0 the corresponding yellow Led will flash. In this way a quick indication of the correct operation of the sensors and the signals can be obtained.
- RS232 =ON during serial connection to a PC

Important: Check besides the green LED also the LED “all signals>0”.

Note that the serial connection consumes extra power, so do not permanently connect if the logger is battery powered.

The recorded values can be checked by making contact with a computer. The last recorded value can be reviewed or all recorded data can be downloaded to a PC.

The system can also be tested by simulating the input signals e.g. for wind speed and direction use the 12 pole testplug A20, which should be connected to the input connector where normally the windsensors are connected. The instantaneous values and the recorded values should be according to the value of the simulated input.

Note that a testplug consumes extra power, so do not permanently connect if the logger is battery powered.

If the instrument does not operate correctly the following action must be carried out:

1. Check the power supply/battery voltages, using the EKO 20 software
2. Take memory card and batteries out of the instrument
3. Put prepared memory card in slot
4. Put batteries back in the instrument

When the operation is still not correct check the power supply or batteries and connect again. Check again with available testplug.

If the datalogger system is functioning correct with testplug, but not with the sensors connected, the connections of the sensors must be checked again.

If however the datalogger system is functioning incorrect with the testplug connected, the datalogger is defect. If you cannot solve the problem this unit should be repaired or replaced. Contact your supplier if you cannot solve the problem yourself. Describe the problem in detail. Do not try to repair the electronics yourself. EKOPOWER will support you with spare parts or will repair the equipment as soon as possible.

The maintenance of the system is limited to the replacement of the batteries and the (optional) silicagel. Of course the data of the memory card should be transferred for dataprocessing. For the maintenance of the sensors refer to the separate datasheets.

The correct functioning of the system is guaranteed for one year. Guarantee cannot be claimed if:

- damage is caused by lightning
- the sealing of the printed circuit board is broken
- the system is not used according to this manual

For remarks and suggestions we appreciate it if you contact us. If necessary send the instrument post paid to your supplier.

EKOPOWER takes no responsibility for the conclusions of the measurements.

5 Troubleshooting

After starting the program there is no Configuration file listed.
The program can not find any Configuration files in the directory in which the program is installed. Copy your Configuration file into the directory in which the program is installed.

Setup can not find a serial communication port.
No port installed on your computer, or installation is incorrect. Refer to windows help.

The Memory Cards option can not be selected.
There is no PC Card Drive selected. Run *Setup* to install the correct PC Card Drive.

The Serial Connection option can not be selected.
There is no serial communication port selected. Run *setup* to install the correct port.

The Modem option can not be selected.
There is no serial communication port selected or no phonenumber is entered. Run *setup* to install the correct port. Enter the phone number, refer to section 3.2.

"No memory card in slot present" error.
There is no memory card in the slot which is installed by the setup option. Put the memory card in the correct slot or run *setup* to change the PC card drive.

"No logger found" error.
Check if the logger is connected correctly to the PC. Check if the correct serial communication port is used. Check if the correct communication speed (baudrate) is used (refer to section 3.2).

After preparing the EKO20 reacts with a "card not prepared" error.
The card is not correctly formatted under windows. Format the card correctly before preparing the card.

Appendix A Specific details of supplied system

Appendix B Data sheets of system parts